A synopsis submitted for PhD research work,

on the topic

A Study of Problematic Smartphone Use, Loneliness, and Aggression in relation to Psychological Well-being of Adolescents.

Submitted to

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Topic of the Research:

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Introduction:

In the present era, technological progress taking place at a very fast pace has greatly influenced almost all aspects of life in the modern global society. One of these technological advancements is the smartphone.

When Alexander Graham Bell introduced a new communication device in Philadelphia in 1876 (Gokcearslan, S., et al, 2018) he probably never imagined that his invention would ever take the form it has now. If a list of survival tools were made for people in the current modern society, it would include keys, identity cards and money as well as mobile phones (Emanuel, R., et al, 2015).

Nowadays, the functions of this invention, which was designed for the sole purpose of transmitting speech, have become even more diverse, first through mobile phones, and then through smartphones. Along with providing the opportunity to access the Internet anytime, anywhere, smartphones today have become much more than a means of communication between individuals. They have transformed into devices that provide virtual environments and digital identities through which people enjoy and form social relations, allowing users to conduct professional work, organize personal tasks, make purchases, manage their finances, and also enable users to overcome the challenges of everyday life. With its powerful functionalities and wide acceptance across different cultures and societies, smartphones have undoubtedly become an integral part of the daily activities of people of all ages. It is rapidly becoming the most widespread technological device that most people carry with them everywhere in modern society. For many smartphone users, the first thing they look at in the morning and the last thing they look at before going to sleep is their smartphone (Lee, Y. K., et al, 2014).

Although smartphones have become an integral part of our lives and have made our lives much smarter and more efficient, despite these advantages and popularity of smartphones, many others argue that smartphones have more disadvantages than advantages. They can have negative effects, including increased

dependence and in some cases addiction-like effects. When use becomes excessive/dependent, it can negatively impact individuals' lifestyles, which can have physical, psychological, behavioural, social, and cognitive effects (Gezgin & Cakir, 2016). Therefore, excessive use of smartphones can interfere with various aspects of daily life, and this excessive use triggers a series of behaviours that may be inappropriate for the users and the people close to them (Seo, D. G., et al.,2016). However, the issue is not with the use of the device itself, but with the way people use it and the time they spend on it, especially adolescents (Attamimi, 2011).

Adolescence, considered one of the most important time periods for physical, intellectual, personality, and social developmental changes (Scales & National Middle School Association, 2010), is now influenced by smartphones. Evidence of this effect was found when longitudinal research with adolescents showed that the rapid adoption of smartphones in the early 2010s changed both the way adolescents spent time and their psychological well-being (Twenge, 2017). For example, adolescents spent less time in in-person social interaction and more time in electronic communication.

Research shows that excessive use of smartphone may affect user behaviour in real life due to a lack of interpersonal competence such as initiative to negotiate, assertiveness, openness, emotional competence and ability to resolve conflict due to increased dependence on smartphones (Hidayati, D.S., 2018). Smartphones were invented to make communication easier, but recent research found the opposite, smart phones make people addicted and have less direct interaction and this is contrary to the main goal of making communication easier.

Previous research has studied problematic smartphone use and its impact on face-to-face interactions and found that problems arise when people become dependent on using their smartphones and a part of their lives is now spent virtually (Gezgin, D.,2017; Drago, 2015). People now pay less attention to whom they are with in person and keep themselves busy with their smartphones, not only to connect with other people on various social media platforms but also for features and functions like reading messages, e-books or news, watching videos or reels, responding to messages or emails, sending photos or video, or joining online games. These situations result in reduced or interrupted face-to-face contact between people. Additionally, these conditions may lead to a decrease in the number of real-life friends and social relationships. Due to the reduction in the quality and quantity of social relationships, people feel lonely (Hidayati, D.S., 2018).

Loneliness is a subjectively unpleasant experience caused by a decline in the quality and quantity of one's social relationships (Peplau & Perlman, 1998). Loneliness occurs when there are discrepancies between individuals' current social relationships and their desired social relationships. Cherry (2015) explained that when a person experiences loneliness he or she feels unwanted by others, experiences emptiness, and feels alone even when surrounded by people or in a crowd (Hidayati, 2015).

An important factor in loneliness may be less social interaction as people engage in other activities instead of social interaction, such as browsing the Internet or spending time using gadgets such as smartphones. Hu's research (2007) found that communication through the Internet and various messaging tools influences loneliness. On the other hand, direct communication can reduce loneliness. Some research has shown that loneliness may be linked to problematic smartphone use (smartphone addiction). For example, Bian and Leung (2014) found that smartphone addiction in college students could be predicted by the students' level of loneliness, the higher the score on loneliness, the more likely they were to become addicted to their smartphones. Another study on this topic reported that adolescents who felt lonely had a higher percentage of daily mobile phone use, indicating mobile phone addiction (Sar, 2013).

Additionally, some studies have shown that lonely people are more likely to have weaker relationships, spend less time on social activities, and have difficulty maintaining stable relationships. These conditions ultimately lead to a decline in the overall well-being of the individual. Another aspect revealed in Kim's (2009) research is that excessive use of the Internet and online communication is mostly done by a person experiencing loneliness, who avoids real social relationships due to the lack of ability to make social contacts. In conclusion, a person who experienced loneliness due to the lack of ability to socialize shifted his expression to virtual networks. According to the compensatory Internet use theory, when individuals are maladjusted in the real world, they may use mobile phones (virtual networks) to avoid negative emotions (loneliness). Some studies also indicated that loneliness was an important factor in problematic mobile phone use (Ma et al., 2020).

Furthermore, according to the following research findings, excessive smartphone use contributes to psychopathological outcomes among users, such as worry/anxiety, depression, antisocial behaviour, social fragmentation, suicidal tendencies, and stress due to loneliness and feeling isolated from others. (Cerniglia et al., 2019a, 2019b;

Cherry, 2015). Madeleine et al. (2018) conducted a study among 151 young adolescents to examine the association between short-term and long-term daily use of digital technology and the development of mental health symptoms. The findings of the study showed that due to the high rate of excessive use of mobile phones (80%) adolescents reported at least one symptom of conduct disorder (CD) (breaking property, aggression, robbery, use of weapons) was found, and (50%) young adolescents were diagnosed with three or more CD symptoms.

Cerniglia et al. (2017) have reviewed the literature showing associations between Internet addiction and adolescents' neurobiological, psychosocial, and clinical symptoms in general. They found that there is a relationship between Internet addiction in adolescents and loss of control, anger, distress, isolation from social life, and family conflict.

Despite such a wide range of research on smartphones, very few studies or literature reviews explore the relationship between problematic smartphone use and psychological well-being in adolescents. The few data available generally suggest that the overall well-being of teenagers has begun to decline since smartphones became ubiquitous. A study conducted by Harwood and Anglim (2019) found that problematic smartphone use was associated with lower well-being on almost all scales. Consistent with this, problematic smartphone use is negatively associated with psychological well-being among university students; and greater life satisfaction in teens is –in turn– linked to a combination of less screen time and higher physical activity.

Recent studies have examined the relationship between smartphone dependence and age. A study by Pearson and Hussain (2016) showed that young individuals are more prone to smartphone addiction. According to the results of the Deloitte Global Mobile Consumer Survey (2018), the 18–25 age groups use telephones twice as much as the 45–50 age group during family time. Furthermore, Campus Technology (2018) shows that smartphones are one of the top preferred devices for students. Another investigation conducted by the Pew Research Center (2018) found that 95% of university students used a smartphone.

Similarly, while loneliness can be experienced at any age, research shows that it is most experienced by adolescents. Based on a large survey, Parlee's stated that 40,000 people experienced loneliness and 79% of them are teenagers (Hidayati, D.S.,2018). In 2010, a mental health foundation’s survey in England revealed that of the 2256 participants aged 18–34 in their study, 24% experienced more loneliness

than participants aged 55 (Mental Health Foundation, 2010). Some researchers found that the prevalence of loneliness among adolescents is gradually increasing. Data from 113 countries revealed that the overall prevalence of loneliness among adolescents ranged from 9.2% in Southeast Asia to 14.4% in the Eastern Mediterranean region (Surakalim et al., 2022). Several other studies have elaborated on the role of age as a potential predictive variable influencing aggression and antisocial behaviour.

Review of Literature:

Smartphone ownership has increased over the past decade, reaching around half or more of the global population (Newzoo, 2021; Turner, 2022). Smartphones have taken the places of small computers with functions they provide other than telephone communication such as personal and business work, news and social media access, entertainment and various applications. In addition, its compact size and mobile character enable individuals to easily carry and use any anytime anywhere.

Besides the benefits of smartphones in daily life, Smartphone use becomes problematic when users have difficulties controlling their use and as a result suffer impaired daily functioning (Horwood & Anglim, 2018). Excessive usage of a smartphone also known as Problematic smartphone use, is defined as the persistent and excessive pattern of smartphone use accompanied by significant impairments in daily-life functioning, and the impairments could include daily-life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationships, overuse, and tolerance (Kardefelt-Winther et al., 2017; Kwon, et al., 2013).

Problematic smartphone use, also often referred to as smartphone addiction (e.g., Sun, et al., 2019) has garnered increased attention from researchers and public health practitioners in recent years. However, given the relatively recent emergence of problematic smartphone use as an area of research, definitions of the concept are still evolving (Horwood & Anglim, 2018; Nahas, et al., 2018).

Smartphones, with their pervasive acceptance and powerful functionality, have undoubtedly become an integral part of adolescents' daily activities (Skarupova et al., 2016). Adolescents have relatively lower levels of self-control primarily due to the immaturity of cortical development (Casey & Caudle, 2013; Steinberg et al., 2008), and they tend to be more enthusiastic about the use of new electronic devices while growing up and living in an era of unprecedented advancements in smart technologies,

especially smartphones (Kim, 2017). Therefore, they may be more susceptible to the development of problematic smartphone use than adults (Choliz, 2012; Lopez-Fernandez et al., 2013).

Over the past few years, research has begun to explore potential relationships between smartphone use and various indicators of mental health, particularly among traditional college-age students. One area that has received some attention is the impact on interpersonal relationships, often using loneliness as a primary indicator. For example, Tan et al., (2013) found that increased daily hourly smartphone use was associated with increased reports of loneliness in a sample of Turkish university students. Similarly, Bian and Leung (2015) found that the higher Chinese university students scored on loneliness and shyness, the more likely these students were addicted to their smartphones. Furthermore, Darcin et al. (2016) found that both loneliness and social anxiety are predictors of smartphone addiction in Turkish university students. Overall, there appears to be an association between excessive smartphone use and self-reports of significant interpersonal distress. Dayapoglu et al., (2016) also found in their study that there is a positive relationship between loneliness and problematic mobile phone use in nurse students.

Loneliness is a perceived gap between a person's desired and actual relationships (Russell, Peplau, and Cutrona 1980). It is not just the presence of another person, but someone who values and cares about 'me' and someone with whom 'I' can trust, communicate and share freely (Cacioppo and Patrick 2008). Early researchers considered loneliness to be a single dimension (Russell et al. 1984) but later introduced two dimensions, first social loneliness caused by lack of close and honest relationships, and second emotional loneliness caused by lack of social contact. (DiTomaso and Spinner 1997).

Loneliness is a serious and major developmental problem in adolescence. (Dayapoglu et al., 2016). Social loneliness arises from relocation to a new environment and emotional loneliness arises from the lack of close friends resulting in feelings of discomfort, anxiety, anger, frustration, sadness, and depression (Demirli and Demir 2014). Bian and Leung (2015) found a relationship between loneliness and fearfulness resulting in smartphone addiction.

Loneliness compels individuals to use smartphones as a means to form relationships, thereby satisfying their sense of belonging (LaRose and Eastin 2004; Wu et al. 2013); As a feeling of relief and release from feelings of loneliness and an

outlet for negative emotions. Studies show that individuals experiencing loneliness may be more likely to engage in smartphone usage to contact others in order to alleviate negative feelings and gain assurance from friends, family, or their partner (Bian & Leung, 2015; Kim, 2017). Additionally, Lonely individuals may also become more reluctant to engage in face-to-face interaction, preferring smartphone-mediated communication instead (Kim, 2017). Oulasvirta et al. (2011) attributed smartphone addiction to a mixture of biological, psychological, and social factors. People become vulnerable to addiction when they feel neglected or have a poor social life. Gradually, the user falls into patterns of repetitive behaviour as a means of mood enhancement and the level of psychological dependence increases as the repetitive behaviour becomes reinforced (Everitt and Robbins 2005). Such excessive dependence often turns into addiction. Mahapatra (2019) and Bhardwaj & Ashok (2015) also established a relationship between smartphone addiction and loneliness.

In short, it has been observed that smartphone use becomes problematic due to loneliness, and with increase in phone usage time, loneliness increases. Thus, a vicious cycle exists in which both variables are causes and consequences of each other (Yao and Zhong, 2014).

Among the negative effects of problematic smartphone use, aggression has now also become the focus of scholarly attention. According to Buss (1992), “Aggression is a feeling of anger or vengeance that results in hostile or violent behaviour”. With the rapid popularity of smartphones, their excessive use has affected various aspects of studies and life of teenagers. In this line, Um et al. (2019) reported that although smartphone use can reduce distress by providing immediate rewards and opportunities to engage in various activities, problematic smartphone use is a significant risk factor for aggression. Similarly, Yen et al. (2009) found a high correlation between aggressive behaviour and problematic smartphone use. Furthermore, studies by Mehroof and Griffiths (2010) showed that problematic smartphone use was significantly correlated with aggression.

Additionally, in a recent study, Elhai et al. (2019) explored the applicability of worry and anger, two psychological constructs that they hypothesized might be positively associated with increased severity of problematic smartphone use. They found that both variables were indeed statistically related to problematic smartphone use at the correlational level. The researchers also reported after a latent profile analysis that as scores on worry and anger measures increased, the likelihood of

being placed in more severe categories of problematic smartphone use also increased. In another study, Vally Z. (2022) also examined these two primary psychopathological constructs, worry and anger, about problematic smartphone use. The results revealed statistically significant associations with problematic smartphone use, anger and worry. These results were evident after correlation and regression analyses. Furthermore, using cut-off scores recommended from the literature to identify participants who scored above the clinical threshold indicative of problematic smartphone use, worry and anger scores were significantly higher in the clinical sub-group.

Borkovec et al. (1998) defined worry as a persistent and negative verbal thought that is unwanted by the person to whom it appears. Worry and rumination appear to have several parallels. Rumination is a construct that has frequently been studied about problematic smartphone use and has consistently been found to be significantly related to problematic smartphone use (Vally et al., 2021). Rumination similarly involves the presence of persistent negative thoughts, that may also be unwanted, but are self-referential (Mennin and Fresco, 2013) and thus both these two constructs can be considered forms of repetitive negative thinking. They also appear to serve a similar purpose, that of enabling the individuals' avoidance of experiencing negative emotion and this typically takes the form of a maladaptive behavioural response (McEvoy et al., 2013; Newman et al.,2013). Given these similarities between worry and rumination, it is likely that worry may also be related to problematic smartphone use.

Generally, well-being is defined by an individual's cognitive and emotional evaluation of his or her life (Diener, 2000). Well-being is not simply the absence of psychological problems (Beck et al., 2003), but rather it describes optimal functioning and experiences. Well-being can be conceptualized from two perspectives, first hedonic (focusing on pleasure) and second eudaimonic (focusing on self-actualization) (Ryan and Deci, 2001). The hedonic perspective considers well-being (i.e. subjective well-being) as the attainment of pleasure and happiness while the eudaimonic perspective (i.e. psychological well-being) emphasizes well-being as the attainment of one's potential, of which happiness is one aspect. This study adopts this holistic concept of well-being. A person's well-being is considered relatively stable: positive and negative experiences cause changes in well-being, but long-term changes are not common (Diener, Lucas, & Scollon, 2006).

Initial research has found that problematic smartphone usage is negatively correlated with various conceptions of well-being including subjective well-being (e.g. Chan, 2018; David et al., 2018; Hughes & Burke, 2018) and mental health (e.g. Rotondi et al., 2017; Lapierre & Lewis, 2016). While some have interpreted this to indicate that smartphones are causing lower levels of well-being (Congman, R.,2019), it is important to consider that well-being and related dispositional factors may also cause perceived and actual problematic smartphone usage.

There are some possible explanations for how problematic smartphone usage may influence well-being. However, it is important to first consider what kinds of smartphone usage are related to well-being. In particular, many aspects of phone usage are functional and facilitate humanistic pathways to well-being such as social connectedness, achieving productive goals, and staying safe. For example, some studies have reported positive relationships between particular smartphone use and Subjective well-being (e.g. facilitating new friendships or social bonding, Chen & Li, 2017; reading e-Books, David et al., 2018). In contrast, in studies examining the relationship between smartphones and well-being, excessive use appears to be more likely to interfere with daily functioning. It has been found that habitual smartphone use predicts problematic smartphone use (Horwood and Anglim, 2018) so it may be reasonable to expect that habitual use would also be associated with lower well-being.

Additionally, problematic or compulsive smartphone usage can have negative impacts on users' social relationships. One element of problematic smartphone usage is known as 'phubbing', short for 'phone snubbing', the act of ignoring social others in favour of using a smartphone. Such usage is associated with poorer close or romantic relationship satisfaction in several studies (Chotpitayasunondh & Douglas, 2016; Lapierre & Lewis, 2016; Rotondi et al., 2017). It could be supposed that relationship decrements may contribute to reduced well-being. In a quantitative study, Costa A. D. et al (2019) found that smartphone use was reducing college students' direct social interactions. This means that college students most of the time use smartphones to play various online games, not being able to interact personally and physically with other people. In this situation, the college student was cut off from direct social contact. The lack of direct social interaction can result in college students becoming isolated from others. This feeling of isolation/loneliness leads college students to psychological problems which leads to a decline in psychological well-being. Furthermore, Kumkagiz

and Gunduz (2016) also found a significant relationship between the level of psychological well-being and smartphone addiction in university students.

Objective:

Based on the above explanations and empirical evidence, present study aims to investigate the correlation between problematic smartphone use and loneliness and their individual and combined effects on the psychological well-being of adolescents. Further, the mediating effect of aggression and worry in between smartphone use and psychological well-being will also be assessed. More specifically, the study addressed the following research questions:

1. How common are problematic smartphone use and feelings of loneliness among adolescents?
2. What are the most important indicators of problematic smartphone use and feelings of loneliness among adolescents?
3. Are there significant associations between problematic smartphone use and adolescents' aggression and worry?
4. Do aggression and worry have a significant impact on the psychological well-being of adolescents?
5. Is there a significant correlation between problematic smartphone use and psychological wellbeing in adolescents?
6. Are there significant relationships between feelings of loneliness and adolescents' worry?
7. Is there a significant correlation between loneliness and psychological wellbeing in adolescents?
8. Whether gender difference is seen in problematic smartphone use, loneliness, aggression, worry and psychological well-being?

Hypothesis:

In light of the above studies, following hypotheses are advanced here:

Hypothesis 1: There will be a significant positive correlation between problematic smartphone use and feelings of loneliness in adolescents.

Hypothesis 2: Adolescents' problematic smartphone use will be positively associated with their aggression and worry.

Hypothesis 3: Aggression and worry will mediate the relationship between problematic smart phone use and psychological well-being.

Hypothesis 4: Problematic smartphone use will have significant impact on psychological well-being of adolescents.

Hypothesis 5: There will be a significant positive correlation between loneliness and worry in adolescents.

Hypothesis 6: Feelings of loneliness will have a significant impact on the psychological well-being of adolescents.

Hypothesis 7: Worry and aggression will mediate the relationship between loneliness and psychological well-being.

Hypothesis 8: Adolescents' problematic smartphone use and feelings of loneliness will have a significant negative impact on their psychological well-being.

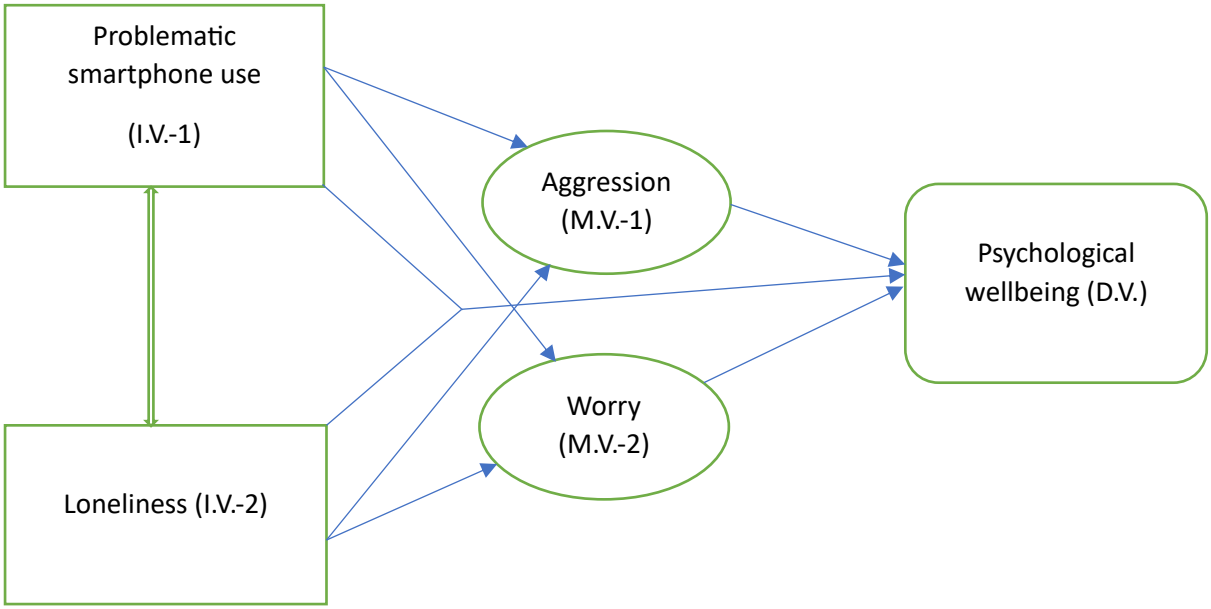

Figure 1: Hypothetical Model of Research

Significance of the Study:

This research may extend the existing body of literature by examining the correlation and directionality between problematic smartphone use and loneliness and their impact on adolescents' psychological well-being. The research will also explore the impact of adolescents' problematic smartphone use, loneliness, aggression and worry on their psychological well-being. The findings of this research may help policymakers, educational institutions, parents, researchers, social workers and health professionals understand the effects of problematic smartphone use and loneliness on the psychological well-being of adolescents.

Methodology:

The following samples and measures will be used for this proposed research:

Sample:

For this proposed research, 600 hundred boys and girls from various private and government schools/colleges of Samastipur and Darbhanga districts will be selected through non-probability purposive sampling method. This cross-sectional study will be conducted on class 11th, 12th and Sem 1 (UG courses) students and 200 samples will be taken from each class.

	Government institutions			Private institutions		
	Class11th	Class12th	UG(Sem-1)	Class11th	Class12th	UG(Sem-1)
Boys	50	50	50	50	50	50
Girls	50	50	50	50	50	50

Measures:

For the proposed research, following measures will be used for the data collection.

A. Psychological Well-being Scale: This scale was developed by Ryff & Keyes in 1995 (Ryff, C.D., Keyes, C.L.,1995). It is a 42-item long and 18-items short version scale measuring six dimensions, namely 1. Autonomy, 2. Environmental mastery, 3. Personal growth, 4. Positive relations with others, 5. Purpose in life, 6. Self-acceptance. Each item is rated on 7-point scale.
B. Problematic smartphone Use scale: This scale popularly known as smartphone addiction scale-short version (SAS-SV) developed by Kwon et al, (2013). Its measures smartphone addiction. The SAS-SV is specifically designed to identify the level of smartphone addiction risk, and also identify and distinguish between high-risk groups and individual. It comprises of ten questions with six answer choices, scored using a Likert type 6-point scale.

C. Loneliness scale: Russell (1996) developed a scale, popularly known as UCLA Loneliness Scale (Version 3). It contains 20 items and each rated on 4-point scale ranging from Never, Rarely, Sometime to Always.

D. Aggression scale: Aggression will be measured by the Brief Aggression Questionnaire which was developed by Webster (2015). It is 12 item Questionnaire scored on 7-point scale.

E. Worry Scale: Worry will be measured by Brief version of Penn State Worry Questionnaire (brief PSWQ) developed by Topper, et al. (2014). It measures worry state of an individual. It is a five-item instrument that measures severity of worry. The response ranging from 1 (‘‘not at all typical of me’’) to 5 (‘‘very typical of me’’).

In due course of time, other suitable scales of similar nature will also be used.

Chapterisation:

The proposed research work will be presented in the following chapters:

1. Introduction
2. Review of Literature
3. Objectives and Hypothesis
4. Methodology
5. Results and Discussion
6. Summary and Conclusion
7. References
8. Appendix

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